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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/788,700

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Sidlgata V. Sreenivasan

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EXAMINER

DANIELS, MATTHEW J

ART UNIT

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1791

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/788,700	Applicant(s) SREENIVASAN, SIDLGATA V.	
	Examiner MATTHEW J. DANIELS	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-9,11,13-17,19,20 and 24-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-9,11,13-17,19,20 and 24-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 March 2008 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 27-29** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no indication that the instant invention was designed to exclude printing ink.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-3, 5-8, 11, 13-15, 27, and 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Colburn (Doctor of Philosophy dissertation, University of Texas at Austin, 2001) in view of Choi (US 2002/0094496) and Chou (USPN 6482742). **As to Claims 1 and 9**, Colburn teaches a method, which is used or could be used in an imprint lithography system, for forming a layer on a substrate (page 22, Fig. 2.1, (4)), the method comprising:

Forming a plurality of flowable regions on a substrate (page 55, section 3.4);

Contacting the flowable regions with a plurality of molds disposed on a template (pages 55-58); and

Solidifying the plurality of flowable regions (page 22, Fig. 2.1).

Colburn is silent to (a) the plurality of imprint lithography molds having three dimensional relief patterns resulting in the flowable regions conforming to the three dimensional relief patterns so that the plurality of flowable regions maintain three dimensional patterns conforming to the three dimensional relief patterns, and (b) contacting further including flexing the template to conform to a topography of a substrate.

However, these aspects of the invention would have been obvious for the following reasons:

(a) Choi teaches a plurality of imprint molds having three dimensional relief patterns (Fig. 4, item 401, Fig. 6). For example, in Fig. 4, each patterning region (item 401) is analogous to items 40, 42, 44, and 46 in Fig. 10 of the instant application. Choi describes the channels between the patterning region as “entrainment channels” which entrain excess fluid and prevent it from spreading to adjacent patterning areas through its greater depth than the patterning area ([0090]-

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[0091]). In combination with the droplets of Colburn, the Choi template would prevent spreading of the resist to the adjacent patterning areas.

(b) Chou teaches it is desirable to provide a flexible mold and substrate such that the mold and substrate will conform despite deviations from planarity (3:33-38) by application of fluid pressure to press the mold into the surface (3:50-67). Additionally note the Choi also suggests that such compressible molds are known ([0087]).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Choi and Chou into that of Colburn for the following reasons:

(a) The Choi process and the Colburn process are both imprint lithography techniques, and even more specifically, both disclose step and flash imprint lithography techniques. The combination merely provides the use of a known technique (Choi's entrainment channels) with a similar process (Colburn) in the same way and to provide the same predictable result, namely that excess fluid is prevented from spreading to adjacent patterning areas through the use of entrainment channels having a depth greater than the patterning area (Choi, [0090]-[0091]).

(b) The Chou technique is similar to the Colburn process (both imprint lithography techniques) but provides an additional improvement that the mold conforms to the substrate, to produce the expected effect that the resulting surface would be more uniform. In view of the similar nature of the Chou technique and the Colburn process, one of ordinary skill would have found it obvious to apply this known technique (of Chou) to the Colburn process to achieve the same results, namely improved uniformity of the resulting surface.

As to Claims 2 and 11, it is submitted that variation in the number of droplets (Colburn) or the number of patterning regions (Choi) would have been obvious, however, Choi teaches in at least one embodiment the use of four patterning regions, and Colburn teaches the use of four droplets (Fig. 3.11) and also draws a trend line which goes through a value of eight droplets, suggesting that value also. **As to Claims 3 and 15**, because Colburn teaches that the value of the multi-droplet compression is lost when all droplets coalesce (page 58) and in view of the entrainment regions of Choi, confining of the material of the plurality of flowable regions to each patterning region would have been obvious. **As to Claims 5 and 13**, Colburn solidifies by applying UV light (page 22). **As to Claims 6 and 14**, in the combination of Choi and Chou with Colburn, it is submitted that the template would flex at a region between the adjacent patterning regions (Chou) since the template would conform to the substrate by flexing everywhere, but would particularly flex between the adjacent molds due to the greater depth (and thus smaller mold thickness) within the entrainment regions (Choi, [0091]). **As to Claim 7**, it is submitted that this limitation is drawn to the order of steps (order of forming the flowable regions), and that any order of applying the flowable regions would have been obvious including concurrent or simultaneous formation. There is no unexpected result asserted with respect to the concurrent or simultaneous formation of the flowable regions versus a sequential formation. **As to Claim 8**, the flowable regions of Colburn are inherently spaced apart (pages 55-58). **As to Claims 27 and 28**, since Colburn and Choi each teach step and flash imprint lithography, the photoresist would not include printing ink.

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4. **Claims 16, 17, 19, 24-26, and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Colburn (Doctor of Philosophy dissertation, University of Texas at Austin, 2001) in view of Choi (US 2002/0094496) and Chou (USPN 6482742). **As to Claims 16, 24, 25, and 26**, Colburn teaches a method, which is used or could be used in an imprint lithography system, for forming a layer on a substrate (page 22, Fig. 2.1, (4)), the method comprising:

Forming a plurality of flowable regions on a substrate (page 55, section 3.4);

Contacting the flowable regions with a plurality of molds disposed on a template (pages 55-58) which spreads the material; and

Solidifying the plurality of flowable regions (page 22, Fig. 2.1).

Colburn is silent to (a) the plurality of imprint lithography molds having three dimensional relief patterns resulting in the flowable regions conforming to the three dimensional relief patterns so that the plurality of flowable regions maintain three dimensional patterns conforming to the three dimensional relief patterns, and (b) confining the material associated with each flowable region to an area such that the substrate is populated by a plurality of physically separated imprinted layers corresponding to the flowable regions.

However, these aspects of the invention would have been obvious for the following reasons:

(a) Choi teaches a plurality of imprint molds having three dimensional relief patterns (Fig. 4, item 401, Fig. 6). For example, in Fig. 4, each patterning region (item 401) is analogous to items 40, 42, 44, and 46 in Fig. 10 of the instant application. Choi describes the channels between the patterning region as “entrainment channels” which entrain excess fluid and prevent it from spreading to adjacent patterning areas through its greater depth than the patterning area ([0090]-

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[0091]). In combination with the droplets of Colburn, the Choi template would prevent spreading of the resist to the adjacent patterning areas.

(b) Since the entrainment channels of Choi prevent excess fluid from spreading to adjacent patterning areas ([0090]-[0091]), it would obviously confine the material from each flowable region to the patterning areas, producing a substrate populated by a plurality of physically separated imprinted layers corresponding to the flowable regions. It is noted that Colburn teaches four droplets (Fig. 3.11) and Choi provides four patterning regions (Fig. 4).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Choi into that of Colburn for the following reasons:

(a) The Choi process and the Colburn process are both imprint lithography techniques, and even more specifically, both disclose step and flash imprint lithography techniques. The combination merely provides the use of a known technique (Choi's entrainment channels) with a similar process (Colburn) in the same way and to provide the same predictable result, namely that excess fluid is prevented from spreading to adjacent patterning areas through the use of entrainment channels having a depth greater than the patterning area (Choi, [0090]-[0091]).

As to Claim 17, it is submitted that variation in the number of droplets (Colburn) or the number of patterning regions (Choi) would have been obvious, however, Choi teaches in at least one embodiment the use of four patterning regions, and Colburn teaches the use of four droplets (Fig. 3.11) and also draws a trend line which goes through a value of eight droplets, suggesting that value also. **As to Claim 19**, Colburn solidifies by applying UV light (page 22). **As to Claim 29**, since Colburn and Choi each teach step and flash imprint lithography, the photoresist would not include printing ink.

5. **Claim 20** is rejected under 35 U.S.C. 103(a) as being unpatentable over Colburn (Doctor of Philosophy dissertation, University of Texas at Austin, 2001) in view of Choi (US 2002/0094496) and further in view of Chou (USPN 6482742). Colburn and Choi teach the subject matter of Claim 16 above under 35 USC 103(a). **As to Claim 20**, Colburn is silent to the contacting further including flexing the template to conform to a topography of a substrate. However, this aspects of the invention would have been obvious over Chou, who teaches it is desirable to provide a flexible mold and substrate such that the mold and substrate will conform despite deviations from planarity (3:33-38) by application of fluid pressure to press the mold into the surface (3:50-67). Additionally note the Choi also suggests that such compressible molds are known ([0087]).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method Chou into that of Colburn for the following reasons:

(a) The Chou technique is similar to the Colburn process (both imprint lithography techniques) but provides an additional improvement that the mold conforms to the substrate, to produce the expected effect that the resulting surface would be more uniform. In view of the similar nature of the Chou technique and the Colburn process, one of ordinary skill would have found it obvious to apply this known technique (of Chou) to the Colburn process to achieve the same results, namely improved uniformity of the resulting surface.

Response to Arguments

6. Applicant's arguments filed 19 March 2008 with respect to the rejection(s) under 35 USC 103(a) in view of Everhart, Howell, and Nemoto have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made over Colburn in view of Choi and Chou.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
5/22/08